The notion of statistical quality in the European Statistical System – a few spotlights

Overview

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- The role of statistical data in the EU
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The notion of quality

In philosophy *quality* simply stands for an attribute, a property of an object.

Quality can be seen as related either to subjective feelings or to objective facts.

Quality can mean a degree of excellence, as in, "a quality product“.

The *quality* of something depends on the criteria being applied.

Subjectively, something might be considered *good quality*, because it is useful.

In everyday language the term *quality* is given a positive value.

The notion of quality

The System of Profound Knowledge by Deming, consists of four parts, one of them *Knowledge of variation*: the range and causes of variation in *quality*, and the use of statistical sampling in measurements.

The focus of the concept of *quality control* with the help of statistical methods is clearly on technical attributes of specific products.

The System of Profound Knowledge is the basis for the application of Deming's famous 14 Points for Management, which are considered as the starting point of what was then called *Total Quality Management*.

The notion of quality

Total quality concept

A product‘s *quality* is determined by both the existing and potential opinions of users of the product and its fitness for their purposes.

The *quality* concept should reflect all aspects of a product that affect users‘ views on how well the product meets their needs and expectations.

The producer’s *quality* concept should not stand on whether the product is of good or bad *quality* in any absolute sense.

Source: Encyclopedia of Statistical Sciences

The notion of quality

In the world of empirical research one has to choose ‘observable facts’ to which the theoretical model is to be applied. In this context, Haavelmo (1944) made the important distinction between

- ‘theoretical variables’,
- ‘true variables and
- ‘observational variables’.

Source: Haavelmo Trygve,The Probability Approach in Econometrics, Supplement to Econometrica

The notion of quality

“The ‘true variables’ represent our ideal as the accurate measurement of reality, while the variables defined in a theory are the true measurements that we should make if reality ‘as it is in fact’ were actually in accordance with our theoretical model”.

“‘The ‘observational variables’ are the outcome of the attempts of the statisticians to provide the best approximation to the ‘true variables’”.

The notion of quality

Analytical objective

Basic decisions of the statistician

- Statistical units
- Classifications
- Data sources
- Variables
- Definitions
- Etc.

Observable phenomena

The notion of quality

Analytical objective

Operationalisation

Basic decisions of the statistician

- Statistical units
- Classifications
- Data sources
- Variables
- Definitions
- Etc.

Measurement

Observable phenomena

Quality of official statistics

Statistics Canada Quality Guidelines 2009

Statistical data are important because of the use to which they are put. It follows that the *quality* of statistical data can only be judged against their relevance and how well they represent the world we seek to describe.

It also follows that it is important for the statistical agency to have a thorough understanding of the uses to which its data are put, and to do so it must maintain ongoing relations with its user community.

Quality of official statistics

Statistics Canada Quality Guidelines 2009

This principle also recognizes that achieving “perfect” *quality* is neither desirable nor affordable (in fact it is rarely even possible).

Data are subject to numerous sources of error, both sampling and non-sampling, and it is the job of the statistical agency to balance factors such as accuracy, cost and burden on respondents in developing a statistical program.

Minimizing error itself is not the goal; each statistical program must be designed within the context of what is feasible and how important the data are to users.

The European Statistical System - Principles

The development, production and dissemination of European statistics shall be governed by the following statistical principles as defined in Article 2 of Regulation (EC) No 223/2009 on European statistics:

- Professional independence
- Impartiality
- Objectivity
- Reliability
- Statistical confidentiality
- Cost effectiveness

The European Statistical System - Principles

The statistical principles set out in Article 2 are further elaborated in the European Statistics Code of Practice.

Six principles of the Code of Practice deal with the institutional environment, four principles with statistical processes, five with statistical output.

The *Quality Assurance Framework* of the European Statistical System (ESS QAF) identifies possible activities, methods and tools that can provide guidance and evidence for the implementation of the Code of Practice when developing, producing and disseminating European statistics.

The European Statistical System – Principles

The Principles of the Code of Practice together with the general *quality management* principles represent a common *quality framework* in the European Statistical System (ESS).

“Principles are not enough; compliance with them also has to be monitored” (Radermacher, 2011).

For this purpose Peer Reviews have been carried out and an European Statistical Governance Advisory Board (ESGAB) has been established.

The purpose of the ESGAB is to provide an independent overview of the ESS as regards the implementation of the European Statistics Code of Practice.

Quality in the European Statistical System

In order to guarantee the *quality* of results of European statistics according Regulation (EC) No 223/2009 Article 12 seven criteria are to be met.

(a) ‘relevance’, which refers to the degree to which statistics meet current and potential needs of the users;

(b) ‘accuracy’, which refers to the closeness of estimates to the unknown true values;

(c) ‘timeliness’, which refers to the period between the availability of the information and the event or phenomenon it describes;

Quality in the European Statistical System

Quality criteria according Article 12 (cont.)

(d) ‘punctuality’, which refers to the delay between the date of the release of the data and the target date (the date by which the data should have been delivered);

(e) ‘accessibility’ and ‘clarity’, which refer to the conditions and modalities by which users can obtain, use and interpret data;

(f) ‘comparability’, which refers to the measurement of the impact of differences in applied statistical concepts, measurement tools and procedures where statistics are compared between geographical areas, sectoral domains or over time;

Quality in the European Statistical System

Quality criteria according Article 12 (cont.)

(g) ‘coherence’, which refers to the adequacy of the data to be reliably combined in different ways and for various uses.

The different dimensions of *quality* represent, to some extent, conflicting goals.

Quality in the European Statistical System

The first five criteria refer to the *quality* of a statistical domain (often a single variable) seen in an isolated way.

The last two criteria ‘comparability’ and ‘coherence’ address the relationship between statistical projects; they deal with system wide aspects.

In many cases the assessment of *quality* concentrates on the first five criteria and in particular on the criterion of accuracy.

Quality in the European Statistical System

An example:

Commission Regulation (EU) No 275/2010 as regards the criteria for the evaluation of the *quality* of structural business statistics.

The *quality report* shall contain both quantitative and qualitative information. Series of quantitative indicators to be provided by Member States regarding accuracy (and reliability):

1. Coefficients of variation
2. Unit non-response

The information shall be provided if sample surveys, a combination of sample surveys and administrative data or administrative data only are used.

European Statistical System - Principles and quality

Among the principles only ‘reliability’, refers more or less directly to one of the *quality* dimensions, ‘reliability’ meaning that statistics must measure as faithfully, accurately and consistently as possible the reality.

All the other principles refer to conditions and means that the *quality* criteria can be met.

According Statistics Canada *quality* of statistical data can only be judged against their relevance and how well they represent the world we seek to describe.

In the terminology of Eurostat whether the data are “fit for purpose” .

The role of statistical data in the EU

European statistics constitute an essential contribution to building the information capacity required to sustain the EU's strategic objectives and the underlying policies and supporting instruments (Vision paper, 2009).

Basis for evidence-based policy-making

- Monitoring
  - Identification of problem areas.
  - Measuring the success of economic policy.
- Providing the empirical basis for simple and complex economic analyses.

The role of statistical data in the EU

“Rather than just provide information for policy makers, statistics have become an arbiter in all manner of social and political debate” (Outrata, 1999).

“Economic and fiscal policy in the EU has been put pretty much on auto-pilot and heavily relies on statistical indicators, fixed thresholds of tolerance and automatic procedures, once those thresholds are crossed by a Member State” (Pesendorfer, 2014).

The role of statistical data in the EU

Maastricht criteria

- Price stability
- Government budgetary deficit Targets and thresholds
- Government debt-to-GDP ratio
- Exchange rate stability
- Long-term interest rates

If a state is found by the Commission to have breached the deficit or the debt criteria, they will recommend the Council of the European Union to open up the Excessive Deficit Procedure.

The role of statistical data in the EU

Europe 2020: **a strategy for jobs and smart, sustainable and inclusive growth**

This strategy is based on five EU headline targets which are currently measured by ten headline indicators.

Objectives at European level are inter alia:

- Raising the employment rate from the current 69% to 75%;
- Boosting the expenditure on R&D to 3% of the GDP from the current 2%;
- Reducing the school drop-out to less than 10% from the current 15% and increase the share of citizens in their early 30s holding a university degree or equivalent title from 31% to at least 40%;

The role of statistical data in the EU

Use of results of national accounts for operational purposes

Monitoring and guiding the euro area macroeconomic and monetary policymaking, and defining criteria of convergence for the economic and monetary union.

Defining criteria for the excessive deficit procedure: measures of government deficit and debt.

Granting financial support to regions in the EU: the allocation of expenditure funds to regions uses regional accounts statistics.

Determining the own resources of the EU budget; the latter depend on national accounts figures in three ways.

The role of statistical data in the EU

Use of results of national accounts for operational purposes

Example: Resources for the investment for growth and jobs goal shall be allocated among the following three categories of NUTS 2 regions (Article 90 of Regulation No 1303/2013):

(a) less developed regions, whose GDP per capita is less than 75 % of the average GDP of the EU-27;
(b) transition regions, whose GDP per capita is between 75 % and 90 % of the average GDP of the EU-27;
(c) more developed regions, whose GDP per capita is above 90 % of the average GDP of the EU-27.

The role of statistical data in the EU

Use of results of national accounts for operational purposes

Resources for the Investment for growth and jobs goal (Article 90 of Regulation No 1303/2013):

The Cohesion Fund shall support those Member States whose GNI per capita, measured in PPS and calculated on the basis of Union figures for the period 2008 - 2010, is less than 90 % of the average GNI per capita of the EU-27 for the same reference period.

The Member States eligible for funding from the Cohesion Fund in 2013, but whose nominal GNI per capita exceeds 90 % of the average GNI per capita of the EU-27 as calculated under the first subparagraph shall receive support from the Cohesion on a transitional and specific basis.

The role of statistical data in the EU

**Implications for the statistical system –
Need for a strong legal basis**

European statistics are based on numerous legal acts and compulsory methodologies laid down in manuals.

The existence of detailed legal provisions and principles is seen as a necessary but not sufficient criterion.

The governance of the statistical system has become a critical issue.

The role of statistical data in the EU

Analytical objective

Basic decisions of the statistician

- Statistical units
- Classifications
- Data sources
- Variables
- Definitions
- Etc.

Observable phenomena

Main elements of the operationalisation are laid down in legal acts

Measurement is delegated to Member States

The role of statistical data in the EU

Some consequences for the statistical system

Improved status and reputation of official statisticians, but at the same time not necessarily more resources for NSIs.

Change in the paradigms governing the statistical work: fulfilling legal provisions as a main concern.

Change in the hierarchy of *quality* criteria: international comparability as a top priority.

The role of statistical data in the EU

Some consequences for the statistical system

Lack of comparability in the published data between Member States can hardly be directly detected by the user.

Data are often seemingly comparable only.

The best “European” solution is not necessarily the best “national” solution. Users should be aware of this trade-off.

Emphasis is laid on the role of statistics for monitoring purposes, not on its role as the basis of empirical research.

Concluding remarks

The specific role statistical data play in the EU led to a set of very specific criteria which has little in common with the traditional dimensions of statistical *quality*.

The hierarchy among the competing objectives (and often corresponding to a hierarchy of *quality dimensions*) is not made explicit. If one is interested in this hierarchy one has to study the legal acts carefully and find out the implicit hierarchy indirectly.

There is a considerable confusion in terminology and the way of arguing. The term *quality* is used and misused in quite different meanings.

Concluding remarks

The term *quality* in National Accounts

The statistical module includes not only national accounts data, but also supplementary information, such as employment statistics on the quantity (persons and working hours) and *quality* (distribution of quantities by age, gender and education level) of labour input per industry (ESA 2010 22.107, satellite accounts).

Concluding remarks

The term *quality* in National Accounts

Principles of measuring price and volume indices: Thus, if *quality* is defined by all the characteristics common to all units of a homogeneous product, differences in *quality* are reflected by the following factors:

(a) physical characteristics;
(b) deliveries in different locations;
(c) deliveries at different times of the day or at different periods of the year;
(d) differences in conditions of sale or the circumstances or environment in which goods or services are supplied.

(ESA 2010 10.18)

Concluding remarks

The term *quality* in National Accounts

Article 4 Quality assessment : For the purpose of this Regulation, the *quality* criteria set out in Article 12(1) of Regulation (EC) No 223/2009 shall apply to the data to be transmitted.

Globalisation will increase the need for extra efforts to maintain the *quality* of national accounts for all economies and groupings of economies (ESA 2010 1.17).

Regional value added is deflated by using:
(a) regional deflators when available and of sufficient *quality*, using price changes of outputs rather than inputs.

Thank you for your attention